MAI–2013-13

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGATION

Surface Nonmetal Mine
Dimension Slate

Fatal Powered Haulage Accident
September 19, 2013

T.G. Mountain Stone
Northrup Quarry
Monroeton, Bradford County, Pennsylvania
MSHA I.D. No. 36-09526

Investigators

Gary C. Merwine
Mine Safety and Health Inspector

Terry L. Heim
Mine Safety and Health Inspector

Ronald Medina
Mechanical Engineer

Gregory J. Mehalchick
Mine Safety and Health Specialist (Training)

Originating Office

Mine Safety and Health Administration
Northeast District
Thorn Hill Industrial Park
178 Thorn Hill Road, Suite 100
Warrendale, Pennsylvania 15086-7573
Donald J. Foster, Jr. Northeast District Manager

OVERVIEW

On September 19, 2013, Timothy Farr, Laborer, age 31, was killed when the flatbed cargo truck he was operating overturned. Farr was transporting four full 250-gallon water totes, which were not secured, while traveling uphill on a steep mine access road. One of the totes shifted and fell off the bed of the truck onto the roadway. The truck began drifting backwards on the 25 percent grade and the remaining water totes shifted. The service brake failed and Farr could not control the truck. The truck turned sharply to an embankment and rolled over onto its roof. The victim was ejected from his seat and entrapped in the operator's cab.

The accident occurred due to management's failure to establish policies and procedures to ensure the victim could maintain control of the truck he was operating. The shifting water totes compromised the stability of the truck, the rear left wheel (driver's side) of a dual tire system (outer tire) was missing on the truck compromising the stability of the truck, the service braking system for the truck had not been maintained in a functional condition, and the main brake line on the truck rusted through, resulting in the brake fluid leaking out of the brake system. Consequently, the victim could not maintain control of the truck. Additionally, the driver was not wearing the provided seat belt; this contributed to the severity of his injuries.

GENERAL INFORMATION

Northrup Quarry, a dimension slate operation owned and operated by T.G. Mountain Stone, is located in Monroeton, Bradford County, Pennsylvania. Jan God, Owner, and Toby Tuttle, Foreman, are the principal operating officials. The mine operates intermittently one eight hour shift per day, five days per week. Total employment is three persons.

Dimension slate is extracted from a single bench in the quarry using a block saw. The blocks of stone are transported by skid steer loader to a designated cutting and splitting area. Finished stone is palletized and transported by truck to a staging area located near the beginning of the mine access road. The stone is sold for use in construction and landscaping.

The Mine Safety and Health Administration (MSHA) completed the last regular inspection at this operation on May 29, 2013.

DESCRIPTION OF ACCIDENT

On the day of the accident, Timothy Farr (victim) reported to the mine at 7:00 a.m., his usual starting time. During the morning, Farr removed blocks of slate from the quarry and used a skid steer loader to transport them to the splitting area. Between tasks, he stopped to fill several 250-gallon water totes from a settling pond near the quarry. The water is used during the block sawing process.

Farr loaded a portable generator and four empty 250-gallon water totes on the bed of the cargo truck and traveled downhill along the steep mine access road. Joe Shults, Laborer, followed

Farr's truck in a skid steer loader. At the bottom of the hill, Farr turned the truck around and parked it at the stream crossing or water "filling station." He filled the totes using a submersible pump located in the stream. At approximately 1:45 p.m., Farr traveled up the mine road toward the quarry with Shults following in the skid steer loader.

While Farr traveled uphill on the rough roadway, he had to negotiate three sharp turns or "switchbacks" and grades up to 28 percent. Shults had difficulty keeping pace and lost sight of the truck. Between the second and third switchback, one of the four unsecured water totes fell off the bed of the truck and landed on the side of the road. Farr did not stop and continued to travel uphill making a hard right turn at the third switchback. Approximately 75 feet above the third switchback, the truck lost traction on a 25 percent grade and the rear tires spun. The truck traveled forward a short distance and then drifted backwards. The rear end of the truck turned sharply southward toward an embankment, the load shifted, and the truck rolled over on the passenger side and then on its roof.

As Shults approached the third switchback in the skid steer loader, he observed smoke or dust rising over the surrounding shrubs. Shults continued around the right hand turn and saw Farr's truck overturned, resting on its roof. Shults yelled for Farr, but he was nonresponsive. Shults left the skid steer and went to the truck where he saw Farr pinned inside the cab. Shults checked Farr but he had no pulse. At 2:17 p.m., Shults used his cellular phone to call for emergency assistance. The victim was pronounced dead at the scene by the Bradford County Coroner.

INVESTIGATION OF ACCIDENT

MSHA was notified of the accident at 4:12 p.m., by a telephone call from Jan God, Owner, to Rodney Rice, Supervisory Mine Safety and Health Inspector, Warrendale, PA field office. Dennis Yesko, Assistant District Manager, was notified and an investigation started the same day. An order was issued under provisions of Section 103(j) of the Mine Act. The order was later modified to Section 103(k) of the Mine Act after the arrival of an Authorized Representative at the mine site.

MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident site, interviewed employees, and reviewed documents, conditions, and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management, employees, and local law enforcement and rescue agencies.

DISCUSSION

Location of the Accident

The quarry was located at the top of a hill. The mine access road was steep with grades up to 28 percent. This dirt road, with its uneven surfaces, had three sharp turns or "switchbacks" along its approximate one mile length. Mobile equipment traveled the access road as needed to transport stone, water, pallets, and supplies. The accident occurred just above the third switchback on the mine access roadway, approximately 0.6 mile from the bottom of the hill.

Weather

On the day of the accident, weather conditions were clear with an average temperature of 70 degrees Fahrenheit. Sunrise was at 6:50 a.m. The investigators determined that the weather conditions, lighting, and visibility were not contributing factors in the accident.

Physical Factors

1) The truck involved in the accident was a flatbed Jeep M35A2 Cargo Truck. It was manufactured by the General Products Division of the Jeep Corporation in 1983 under contract for the U. S. military. The truck was later purchased by the mine operator. It was used at the mine for approximately two years to transport water, pallets, processed stone, and supplies.

   The truck was a three axle, six-wheel drive vehicle. A toggle switch on the dashboard allowed the driver to engage or disengage the front wheel drive feature. The two rear axles were equipped with dual tires and the steering axle was equipped with single tires. The truck was equipped with a five-speed manual transmission, a two-speed transfer case, and a turbocharged, six-cylinder, multi-fuel engine. The truck had a hard top metal cab.

   A plate on the dashboard specified that the empty weight was 13,030 lbs., the rated highway payload was 10,000 lbs. and the rated highway total weight was 23,030 lbs. The maximum speed of the truck was 56 mph.

2) Control Positions as Found: The throttle pedal and service brake pedal moved freely and spring-returned upon release. The parking brake was found in the released position. The transmission was found in neutral. The position of the front wheel drive toggle switch indicated the front wheel drive feature was not engaged.

3) Condition as Found: The truck was found upside down and the top of the crushed hard top cab was level with the hood. One of the dual tires on the rear tandem axle, left side, was missing leaving only one tire at that corner, rather than the dual tires found on the other rear axles. The engine was damaged and could not be operated.

4) Load being transported: The truck was initially carrying four totes of water, each weighing approximately 2,075 pounds. One tote fell off the truck prior to the accident, leaving three on the truck when the accident occurred. The total weight of four water totes was approximately 8,300 pounds and the total weight of three totes was approximately 6,225 pounds. This weight did not exceed the rated payload of 10,000 pounds.

5) Brake System Design & Testing: The service brake consisted of a hydraulically-applied, air-assisted, drum-type system that acted at all six wheels. The brake pedal was mechanically linked to a single-chamber master cylinder and the hydraulic output from the master cylinder was connected to the hydraulic chamber of a single air-hydraulic pressure booster. The air-hydraulic pressure booster consisted of an air cylinder and a hydraulic cylinder in tandem, each fitted with a piston with a common piston rod between them. The air piston was larger

than the hydraulic piston; therefore, the resultant hydraulic pressure was higher than the air pressure going to the cylinder.

When the service brake pedal was pushed, pressure from the master cylinder was transmitted through the hydraulic chamber of the air-hydraulic pressure booster to the wheel cylinders through metal brake lines and brake hoses. The single air-hydraulic pressure booster provided hydraulic pressure to the drum brakes at all six wheels. A control valve, actuated by hydraulic pressure from the master cylinder, controlled the amount of air pressure going to the air chamber of the air-hydraulic pressure booster in a direct ratio to the foot pressure on the brake pedal. This air-assist increased the hydraulic pressure going to the wheel cylinders proportionally to how hard the brake pedal was pushed. The truck was equipped with two air tanks and a compressor with a governed output that supplied the air-assisted service brake system.

Brake fluid may have leaked out of the vented master cylinder cap of the overturned truck. Brake fluid was added and the brakes were bled to allow testing. After the brakes were bled and the air tanks were pressurized with an external air source, a significant leak in a steel brake line was found. Brake fluid ran onto the ground when the service brake pedal was pushed. The leaking brake line was attached to a frame rail with clamps and the leak was at one of the clamps located just above the air tanks. The air tanks, the clamp, and the brake line were removed and cleaned. The cause of the leak was found to be corrosion. The truck did not have a split brake system, so the single failure of the corroded brake line caused a total loss of service braking at all of the wheels.

The left-side, rear tandem wheel and brake drum and the right-side, steering axle wheel and brake drum were removed. The brake linings and drums were within the rated specifications for the truck. The drums and linings were clean and dry at both locations.

6) Parking Brake Design & Testing: The parking brake consisted of a driveline drum brake. It was manually applied with a hand brake lever connected to the parking brake drum shoes with a cable. The parking brake drum and linings were clean, dry, and the brake linings were 3/16-inch thick. The hand brake lever adjustment was was more than one-half of the ratchet range. This was all within the rated specifications for the truck.

7) Other Findings: No visible steering system defects were found. The seat belt latched and unlatched when tested.

Toxicology

Post mortem toxicology testing conducted by the coroner's office indicated the use of methamphetamine 140 nanograms per milliliter (ng/ml) and the possible use of amphetamine 52 nanograms per milliliter (ng/ml).

TRAINING AND EXPERIENCE

Timothy J. Farr (victim) had 14 years of mining experience including the last 16 weeks at this mine. A representative of MSHA's Educational Field Services reviewed the training records for Farr which documented that he had received the required annual refresher training. On May 31, 2013, Farr also received task training for the flatbed cargo truck he was operating at the time of the accident.

ROOT CAUSE ANALYSIS

The investigators conducted a root cause analysis and the following root causes were identified:

Root Cause: Management failed to ensure that routine maintenance was performed on the braking system on the truck. The service braking system for the truck had not been maintained in a functional condition. The main brake line on the truck rusted through, resulting in the brake fluid leaking out of the braking system.

Corrective Action: Management established policies and procedures to ensure that maintenance is performed on haul trucks to keep the equipment in functional condition.

Root Cause: Management failed to develop policies and procedures to ensure that loads are properly secured before being transported on trucks.

Corrective Action: Management developed procedures to be followed to properly secure loads before materials, including totes, are transported on trucks. Mobile equipment will also be kept in functional condition. All persons have been trained regarding these procedures.

Root Cause: Management policies, procedures, and controls did not ensure the victim wore his seat belt when operating the haul truck.

Corrective Action: All truck drivers received additional training regarding the required use of seat belts when operating haul trucks. Management will monitor truck drivers to ensure seat belts are worn.

CONCLUSION

The accident occurred due to management's failure to establish policies and procedures to ensure the victim could maintain control of the truck he was operating. The shifting water totes compromised the stability of the truck, the rear left wheel (driver's side) of a dual tire system (outer tire) was missing on the truck compromising the stability of the truck, the service braking system for the truck had not been maintained in a functional condition, and the main brake line on the truck rusted through, resulting in the brake fluid leaking out of the brake system. Consequently, the victim could not maintain control of the truck. Additionally, the driver was not wearing the provided seat belt; this contributed to the severity of his injuries.

ENFORCEMENT ACTIONS

Issued to Northrup Quarry

Order No. 8795603 -Issued on September 19, 2013, under the provisions of Section 103(j) of the Mine Act:

> *An accident occurred at this operation on September 19, 2013, at approximately 1400 hours. This order is being issued, under section 103(j) of the Federal Mine Safety and Health Act of 1977, to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity at the Northrup Quarry until MSHA has determined that it is safe to resume normal mining operations. This order was initially issued orally to the land owner at 1940 hour and has now been reduced to writing.*

The order was subsequently modified to Section 103(k) after an Authorized Representative arrived at the mine. This order was terminated on October 22, 2103, after conditions that contributed to the accident no longer existed.

Citation No. 8796334 - Issued under the provisions of 104(a) of the Mine Act for a violation of 30 CFR 56.9101:

> *A fatal accident occurred at this operation on September 19, 2013, when the victim was transporting four, full 250-gallon water totes on the bed of a M35A2 military truck. While traveling uphill on the mine road the truck began to drift backwards, turned sharply towards the South embankment, rolled over onto its roof and crushed the operator's cab. The victim failed to maintain control of the truck while it was in motion resulting in the fatal accident.*

Citation No. 8796335 - Issued under the provisions of 104(a) of the Mine Act for a violation of 30 CFR 56.9201:

> *A fatal accident occurred at this operation on September 19, 2013, when the victim was transporting four, full 250-gallon water totes on the bed of a M35A2 military truck without securing the load. While traveling uphill on the mine road, one water tote shifted and fell off the bed of the truck onto the roadway between the second and third switchback. The remaining water totes shifted while the truck was drifting backwards above the third switchback. The shifting water totes compromised the stability of the truck resulting in the truck rolling over onto its roof and crushing the operator's cab.*

Order No. 8796336 - Issued under the provisions of 104(d)(1) of the Mine Act for violation of 30 CFR 56.14100(c):

> *A fatal accident occurred at this operation on September 19, 2013, when the victim was transporting four, full 250-gallon water totes on the bed of a M35A2 military truck. The rear left wheel (driver's side) was missing on the truck compromising the stability of the truck. The rear left wheel was taken off in August 2013 with the truck being operated to*

transport water totes, pallets, and processed stone during the month of September without the wheel being replaced. The mine foreman engaged in aggravated conduct constituting more than ordinary negligence in that he was aware of the rear left wheel was taken off, not replaced and operated the truck in this condition to transport materials. This violation is an unwarrantable failure to comply with a mandatory safety standard.

Citation No. 8796337 - Issued under the provisions of 104(a) of the Mine Act for a violation of 30 CFR 56.14131(a):

A fatal accident occurred at this operation on September 19, 2013, when the victim was transporting four, full 250-gallon water totes on the bed of a M35A2 military truck. The victim was not wearing a seat belt creating an ejection hazard. The mine road consists of steep grades, difficult sharp turns or switchbacks, and drop offs of up to 50-feet. The victim was ejected from his seat and entrapped in the operator's cab. The truck was used to haul pallets, water totes, and processed rock up and down the mine road on an as needed basis.

Citation No. 8796338 - Issued under the provisions of 104(a) of the Mine Act for a violation of 30 CFR 56.14101(a)(3):

A fatal accident occurred at this operation on September 19, 2013, when the victim was transporting four, full 250-gallon water totes on the bed of a M35A2 military truck. While traveling uphill on the mine road, the truck drifted backwards on a 25 percent grade when the service brake failed. The service braking system for the truck had not been maintained in a functional condition. The main brake line on the truck rusted through, resulting in the brake fluid leaking out of the brake system. The rusted brake line was mounted to the frame of the truck behind the air tanks.

Approved: Dennis A Vesko Date: 1-6-2014

Donald J. Foster, Jr.
District Manager

LIST OF APPENDICES

APPENDIX A

PERSONS PARTICIPATING IN THE INVESTIGATION

Northrup Quarry

Jan God	Owner
Toby Tuttle	Foreman

Pennsylvania State Police Department

David Pelachick	Criminal Investigator

Mine Safety and Health Administration

Gary C. Merwine	Mine Safety and Health Inspector
Terry L. Heim	Mine Safety and Health Inspector
Ronald Medina	Mechanical Engineer
Gregory J. Mehalchick	Mine Safety and Health Specialist

Pennsylvania Department of Environmental Protection

James McDonald	Supervisor
Justin Abbott	Inspector

APPENDIX B

VICTIM INFORMATION

Accident Investigation Data - Victim Information
Event Number: 6 6 2 5 4 0 6

U.S. Department of Labor
Mine Safety and Health Administration

Victim Information: 1

1. Name of Injured/Ill Employee	2. Sex	3. Victim's Age	4. Degree of Injury:
Timothy Farr	M	31	01 Fatal

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 09/19/2013 b. Time: 14:00	a. Date: 09/19/2013 b. Time: 14:00

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
116 Quarry Laborer	055 Hauling water on Military Truck	Yes X No

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	0	16	0	b. Regular Job Title:	0	16	0	c. This Mine:	0	16	0	d. Total Mining:	14	0	0

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
110 M35A2 Military Truck	110 Tramatic Asphyxza

13. Training Deficiencies:
Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task:

14. Company of Employment: (If different from production operator)	Independent Contractor ID: (if applicable)
Operator	

15. On-site Emergency Medical Treatment:
Not Applicable: | First-Aid: | CPR: | EMT: X | Medical Professional: | None:

16. Part 50 Document Control Number: (form 7000-1)

17. Union Affiliation of Victim: 9999 None (No Union Affiliation)